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**HOP Title:** Connection of families of granules to the formation of the chromospheric network

**Main Objective:** We propose a quiet Sun study of families of granules, super granules, and the connection to the formation of the chromospheric network.

**Scientific Justification:** Hinode SOT has a unique capability to provide continuous flow mapping of structures on the scale of solar granulation during non-eclipse periods. IRIS provides spectral and imaging information on similar scales in the chromospheric region. Correlating surface flows with larger scale chromospheric structures provides insight into energy transport mechanisms from the photosphere into the solar corona. Techniques used in feature tracking (Coherent Structure Tracking or "CST" codes) on several SOT data sets taken from 2010-2015 and joint SOT and SDO datasets (results of HOP 182) can be employed with chromospheric data from IRIS. Preliminary results on longer SOT time series suggest formative mechanisms in network evolution. We plan to investigate the influence of the photospheric flow structures on the chromospheric network.

**Primary Proposer:**

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**Co-Proposer(s):**

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**SSC POC:**

SOT -- Dick Shine (LMSAL)

**Time Period of Proposed Observation:**

One day in October is preferred since neither Hinode nor IRIS are in eclipse season.

**Time window in day, if required:**

6 hours continuous overlap observations required with SOT and IRIS on a single day, any time window is acceptable. Observation should fit between synoptics.

**Target(s) of interest:**

Quiet Sun, disk center (0,0), with Hinode tracking (solar rotation compensation)

**SOT Request:**

BFI: BLUE CONTINUUM, time step 60 s  
BFI: G BAND, time step 120 s  
NFI: NaD1 Stokes IV shutterless, time step 60 s  
Use current FG 0x050c NaD IV shless, 61x82", BC 75x75", 60s, Gb 2min

**EIS Request:**

None

**XRT Request:**

None

**IRIS Request:**

FOV 60" x 60" or larger with SLIT JAW 2832, time step 60 s for the network SLIT JAW 2796, time step 60 s for the granulation and SPECTRA 2796 at the center of the slit jaw (Mg h and Mg k), time step 60 s, to evidence the network.

Proposal has been submitted to Bart De Pontieu.

**Comments:**

HOP 182 (2011) and other SOT-only observations have been supported.

Recent resulting publications:

Malherbe, J.-M., Roudier, T., Frank, Z., and Rieutord, M.: 2015, "Families of Granules, Flows, and Acoustic Events in the Solar Atmosphere from Hinode Observations", *Solar Physics* 290, 321

Roudier, T., Rieutord, M., Prat, V., Malherbe, J. M., Renon, N., Frank, Z., Švanda, M., Berger, T., Burston, R., and Gizon, L.: 2013, "Comparison of solar horizontal velocity fields from SDO/HMI and Hinode data", *A&A* 552, A113

Malherbe, J.-M., Roudier, T., Rieutord, M., Berger, T., and Franck, Z.: 2012, "Acoustic Events in the Solar Atmosphere from Hinode/SOT NFI Observations", *Solar Physics* 278, 241

Roudier, T., Malherbe, J., Rieutord, M., Berger, T., Frank, Z., Prat, V., Renon, N., Gizon, L., and Svanda, M.: 2012a, "Some Dynamic Analysis of the Photosphere from Hinode/SOT and SDO/HMI Observations", in L. Golub, I. De Moortel, and T. Shimizu (Eds.), *Fifth Hinode Science Meeting*, Vol. 456 of *Astronomical Society of the Pacific Conference Series*, 65

Roudier, T., Rieutord, M., Rincon, F., Malherbe, J.-M., Brito, D., Berger, T., Frank, Z., Parés, L., Bourrec, E., and Beigbeder, F.: 2012b, "The Power Spectrum of the Solar Surface Flows from Hinode Data and First Observations with MOF/CALAS Pic-du-Midi", in T. Sekii, T. Watanabe, and T. Sakurai (Eds.), *Hinode-3: The 3rd Hinode Science Meeting*, Vol. 454 of *Astronomical Society of the Pacific Conference Series*, 47

Malherbe, J.-M., Roudier, T., Berger, T., and Frank, Z.: 2011, "Acoustic Events in the Solar Atmosphere", *IEEE Transactions on Plasma Science* 39, 2706